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LAND DEVELOPMENT

ENVIRONMENTAL RESPONSE

True Geothermal Energy Company
Drill Site of Geothermal Well KA-1
Puna, Hawaii

BES Job #4419
December 14, 1995

Latitude: 19°26′ 30″ N
Longitude: 155°00′ W

Prepared By:

Brewer Environmental Services
of
Brewer Environmental Industries

A Report Prepared For:

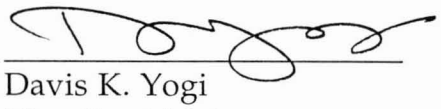
Privileged and Confidential

Ms. Renee Taylor
Environmental Coordinator
True Geothermal Energy Company
P.O. Drawer 2360
Casper, Wyoming 82602

ENVIRONMENTAL RESPONSE REPORT

TRUE GEOTHERMAL ENERGY COMPANY
DRILL SITE OF GEOTHERMAL WELL KA-1
PUNA, HAWAII

BES Job No. 4419
by



Davis K. Yogi
Vice President

Brewer Environmental Services
401 Waiakamilo Road
Honolulu, Hawaii 96817
(808) 832-7900

December 14, 1995

Privileged and Confidential

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1.0 EXECUTIVE SUMMARY

Brewer Environmental Services (BES) was retained by True Geothermal Energy Company (hereinafter "True") to document the response action of a release of an unknown quantity of diesel fuel into the environment. The release occurred over time as a result of overfill practices or leaking equipment around the former location of the 13,000 gallon diesel aboveground storage tank (AST.) For this purpose, BES completed the following tasks: inspected and photographed the conditions of the impacted area, screened soil samples for laboratory analysis, and prepared a report detailing all observations, procedures, laboratory results, conclusions and recommendations.

On March 1, 1995, BES conducted a site reconnaissance and sampled 7 locations near and around the former 13,000 gallon diesel AST. The samples were submitted for laboratory analysis by EPA method 8015M for total petroleum hydrocarbon as diesel (TPH-D). The laboratory reported the TPH-D results for these samples from a low of 300 ppm to a high of 20,000 ppm. The State of Hawaii Department of Health (DOH) action level is 50 ppm for TPH-D.

Between March 15, 1995 and June 29, 1995, True personnel overexcavated approximately 15 cubic yards of contaminated soil from the impacted area. True personnel informed BES that 4" to 12" x 28' x 28' of volcanic material was removed with a backhoe. True stated that the backhoe could not excavate further because the backhoe encountered basaltic rock at a depth of 4" to 12". The contaminated soil was removed and placed in a soil management unit (SMU) on property.

On June 29, 1995, BES visited the site and encountered basaltic rock at a depth of less than one foot at all sample locations. Therefore, the soil samples were secured from a depth of less than one foot below ground surface (bgs). BES secured soil samples for headspace readings using a photoionization device (PID) prior to submitting the samples for laboratory analysis. BES selected soil samples near the March 1, 1995 sample locations in order that BES could measure and document the effectiveness of the removal activities. The PID readings ranged from 4.3 ppm to 48.1 ppm. BES also secured additional soil samples for headspace readings from areas around the AST that were undisturbed by overexcavation activities. BES performed the additional sampling and headspace readings to verify that the impacted area had been delineated. PID readings of these head space soil samples for organic vapors

were 2.5 ppm to 26.2 or below the DOH action level of 50 ppm for total petroleum hydrocarbons.

After BES screened the soil samples with the PID for headspace readings less than 50 ppm from locations inside the overexcavation and around the former AST, BES secured four soil samples proximal to the head space sample locations. These four samples were submitted to the laboratory for confirmatory Benzene, Toluene, Ethylbenzene, and Xylene (BTEX, EPA method 8020) and Polynuclear Aromatic Hydrocarbons (PAHs, EPA method 8270) analyses.

BES also secured a soil sample from the SMU to determine whether the soil had been remediated below the DOH clean up guidelines for BTEX and PAHs.

The laboratory did not detect concentrations above the DOH guidelines. BES recommends that no further action is necessary to close this release and that a copy of this report be submitted to the DOH.

2.0 SCOPE OF WORK

The scope of work to accomplish the objectives consisted of the following tasks:

- Screened soil samples around the AST and in the SMU for laboratory analysis using a photoionization instrument.
- Inspected and photographed the conditions of the overexcavation and the progress of the contaminated soil in the SMU.
- Collected soil samples from the area formerly occupied by the 13,000 gallon aboveground diesel fuel tank.
- Collected one sample from the SMU.
- Laboratory analysis of each of the soil samples collected from the areas formerly occupied by the 13,000 gallon aboveground diesel fuel tank and the SMU for BTEX by method 8020 and PAHs by method 8270.

3.0 BACKGROUND

During the March 1995 BES site assessment, the area around the former 13,000 gallon above ground diesel storage tank (AST) was found to have TPH levels above the DOH guidelines. The 13,000 gallon AST was used to supply fuel to the drilling rig used for geothermal well development. The soil around the AST was sampled and sent to the laboratory for TPH-D analysis using EPA Method 8015M. The laboratory reported that the soil samples had TPH-D concentrations ranging from 300 to 20,000 ppm, which exceeds the DOH action level of 50 ppm.

After True received the laboratory report, True personnel overexcavated the area. The contaminated soil was removed to an on-site SMU. The SMU is 27′ by 15′ by 1′ deep and contains approximately 15 cubic yards of petroleum contaminated soil. The SMU has been lined with 50 mils (50 x 10^{-3} inches thick) plastic and bermed on all four sides (Appendix B - Photograph 4). A plastic cover was in place to minimize fugitive dust and rain water contamination.

4.0 SAMPLING

4.1 Field Analysis

A PhotoVac PID equipped with a 10.2 eV lamp was used to measure organic vapors. The instrument was calibrated prior to field activities using 100 isobutylene span gas.

The PID was used to measure volatile organic compounds in the vapor headspace of soil samples. The standard operating procedure for this analysis is presented in Appendix C. The soil samples for headspace were collected using a stainless steel shovel and sealed in a Ziplock™ bag. The BES technician used latex gloves to collect the sample. The latex gloves were changed after each grab sample to avoid cross contamination. The stainless steel shovel was washed between samples with Liquinox™ soap and distilled water. After each PID reading, the technician waited until a zero reading on the PID was achieved prior to performing another headspace analysis.

4.2 Sampling Plan

In March 1995, BES secured soil samples for laboratory analysis to determine if the storage and use practices of the diesel fuel ASTs had impacted the environment. For the sampling event of June 29, 1995, BES obtained soil samples for the initial headspace readings and later secured soil samples for BTEX and PAH analysis near or at the same sample location as the March 1995 sampling event. BES established this sampling plan and started documenting the response activity performed by True personnel.

Seven headspace samples (1 - 7) were collected (Appendix A-Figure 1A; Photographs 1 and 2; and Table 1.) In addition, the BES technician stepped out five to six feet from sides of the former AST to delineate the areas that may have been impacted by the release and to verify that migration of the diesel release had not occurred. BES selected five locations that were undisturbed by the previous overexcavation activities and collected soil samples (8 - 12) for headspace readings (Figure 1B and Table 2.)

A soil sample was obtained from the soil management unit to confirm the

effectiveness of the soil remediation.

4.3 Laboratory Analysis

Confirmation soil samples were secured within a foot of the selected headspace sample location (Figure 1C, Photograph 3) and for the middle of the SMU (Figure 2.) The soil sample containers were properly labeled and identified with project name, location, date and time of sampling, sampler's name, and analyses. The samples were stored in a cooler with Blue Ice™ and delivered to Brewer Environmental Laboratories (BEL) along with the proper chain of custody document. The soil samples were submitted for chemical analysis for BTEX and PAHs. All samples were extracted and analyzed within the recommended maximum allowable holding times to insure quality. The chain-of-custody with the laboratory report for the soil samples are presented in Appendix D.

5.0 FINDINGS

5.1 Field Analytical Results

The concentration of volatile organic compounds (VOCs) in the vapor headspace of the soil samples ranged from 4.3 ppm to 48.1 ppm. The headspace measurements are presented in Table 1.

Table 1
Headspace Readings Near Previous Sample Locations Analyzed for TPH-D 10 ppm

Sample ID	Depth	June 29, 1995 Time	Reading ppm	Corresponding Sample ID March 1995	TPH - D Result (ppm) March 1995
1	4"	11:50a	6.4	TS7	440
2	3"	11:55a	6.4	TS5	590
3	4"	11:58a	16.9	TS4	2100
4	3"	12:00p	14.2	TS8	2200
5	4"	12:05p	48.1	TS9	300
6	5"	12:07p	14.6	TS6	1400
7	5"	12:08p	4.3	TS1-6 & 1	20000/1700

The concentration of VOCs in the vapor headspace of the soil samples outside the excavated area ranged from 2.5 ppm to 26.2 ppm. The headspace measurements are presented below in Table 2.

Table 2
Headspace Readings
Samples of Undisturbed Areas Around the 13,000 gallon AST

Sample ID	Depth	June 29, 1995 Time	Reading ppm
NS1	3″	12:45p	26.2
NS2	4″	12:50p	3.9
NS3	4″	12:55p	2.9
NS4	4″	12:57p	2.5
NS5	4″	1:00p	10.7

5.2 LABORATORY ANALYTICAL RESULTS

The laboratory analytical results are presented in Table 3 and Table 4. DOH cleanup goals are based on the location of the release with respect to the underground injection control (UIC) line. Above the UIC line, mountainward, where there are potential drinking water sources, DOH mandates a more stringent cleanup criteria than sites below the UIC line. The lab results were non-detect or below reporting limits (BRL) for the cleanup levels of BTEX and PAHs.

Table 3
Results of Laboratory Chemical Analyses for the Soil Samples (MG/KG)
BTEX - EPA Method 8020

Sample No.	Benzene	Toluene	Ethylbenzene	Xylene
4419.1	BRL	BRL	BRL	BRL
4419.2	.006	.01	BRL	.012
4419.3	BRL	.002	BRL	.003
4419.4	BRL	.003	BRL	BRL
4419.SMU3	BRL	.158	BRL	.108
DET LIMITS	0.002	0.002	0.002	0.002
DOH Cleanup Goals	0.05	10.0	7.0	None

BRL- Below Reporting Limits

Table 4
Results of Laboratory Chemical Analyses for the Soil Samples (MG/KG)
PAHs - EPA Method 8270

Sample No.	Benzopyrene	Acenaphthene	Fluoranthene	Naphthalene
4419.1	BRL	BRL	BRL	BRL
4419.2	BRL	BRL	BRL	BRL
4419.3	BRL	BRL	BRL	BRL
4419.4	BRL	BRL	BRL	BRL
4419.SMU3	BRL	BRL	BRL	BRL
DET LIMITS	0.5	0.50	0.5	0.50
DOH Cleanup Goals	1.0	100.0	500.0	100.0

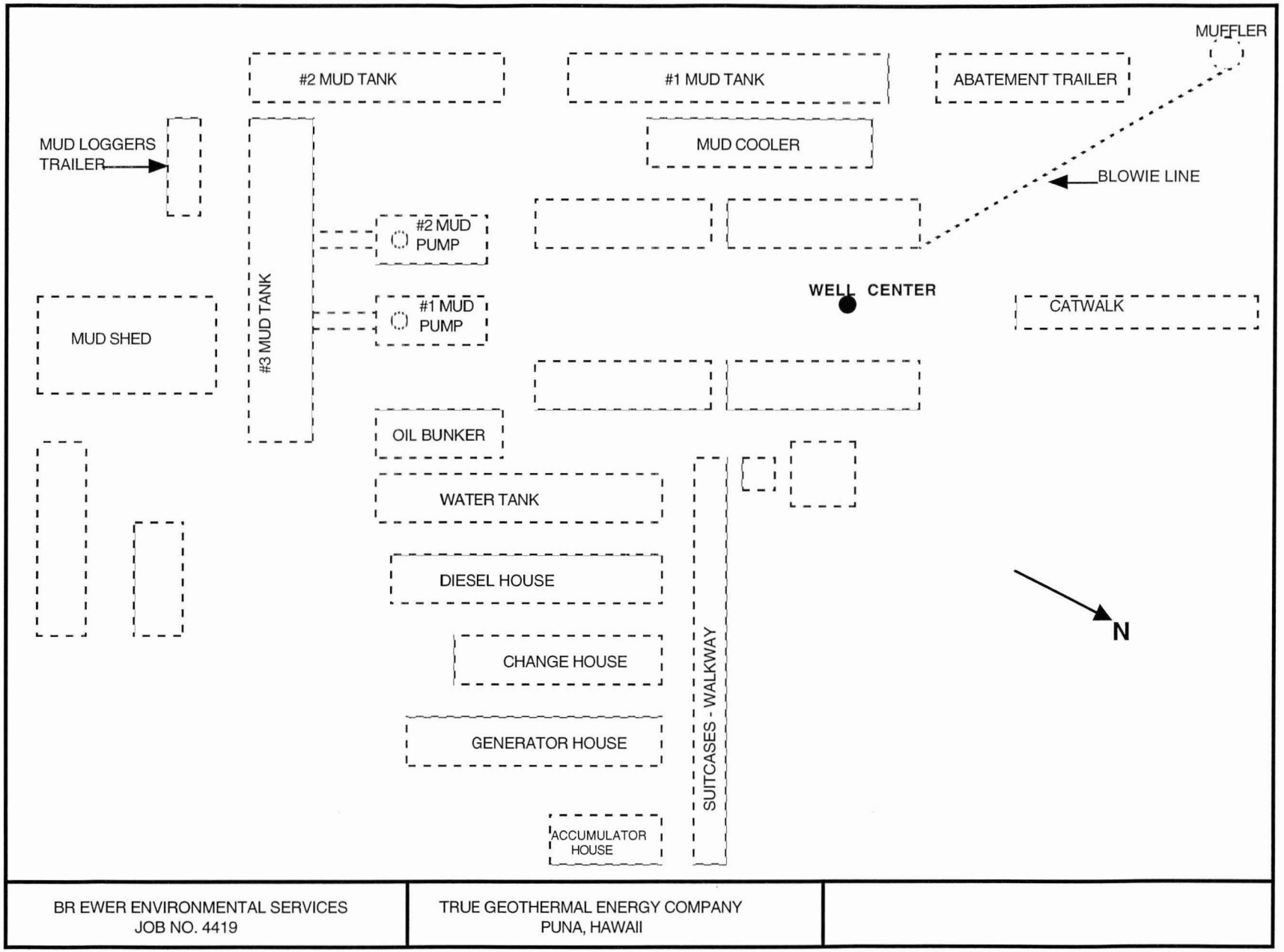
BRL- Below Reporting Limits

6.0 CONCLUSIONS AND RECOMMENDATIONS

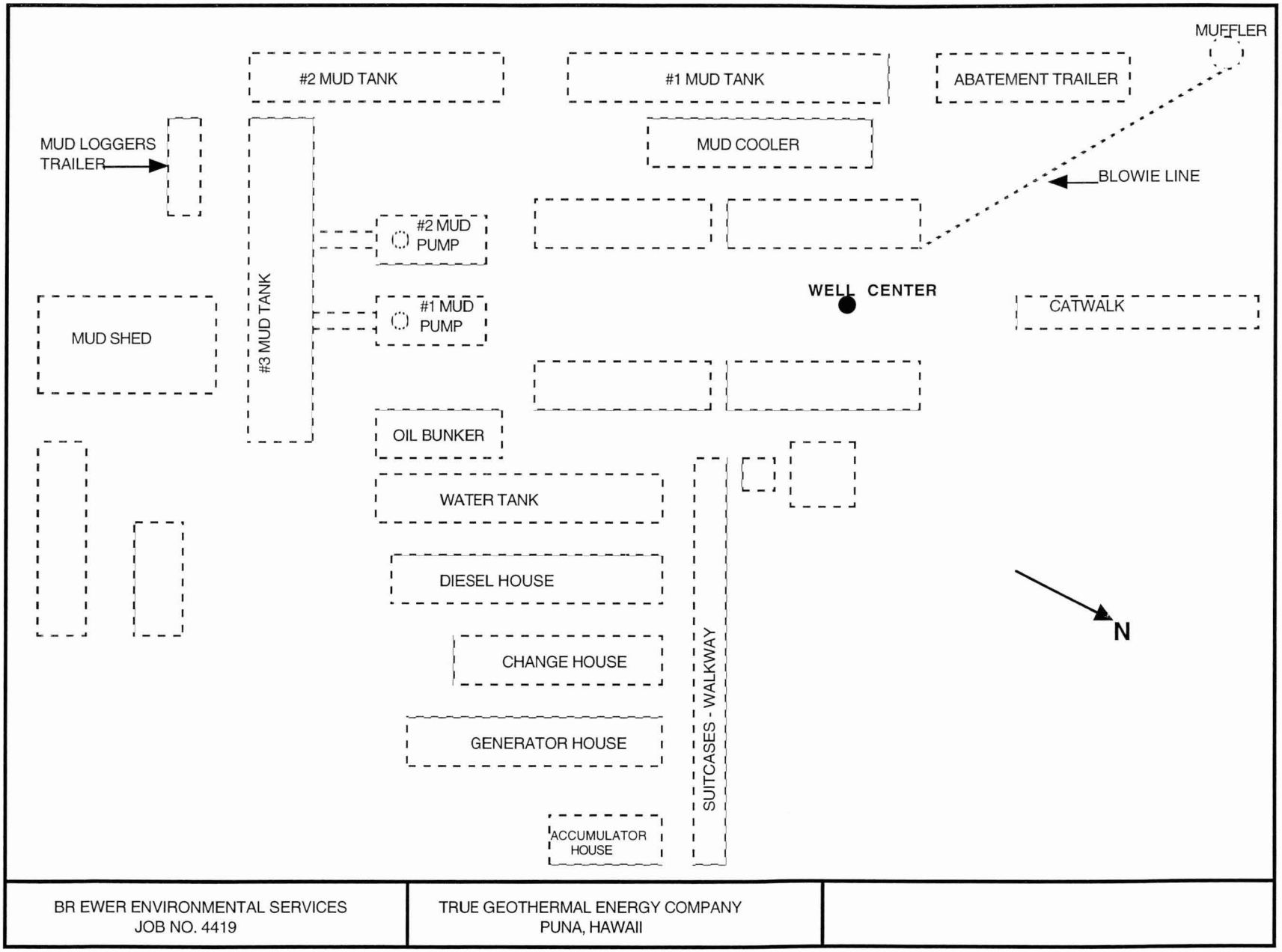
During release response activities, True personnel overexcavated 4"to 12" inches of fuel contaminated soil before encountering basaltic rock. Contamination appeared limited to the soil which was removed and placed in a SMU. Headspace analysis beyond the excavation and in other areas of undisturbed soil were below the DOH action level of 50 ppm TPH. Basaltic rock seemed to limit the contamination to a small area. The contaminated soil in the SMU has been successfully remediated with laboratory analysis reporting results below the DOH clean up goals.

BES recommends that no further action is required.

APPENDIX A
FIGURES

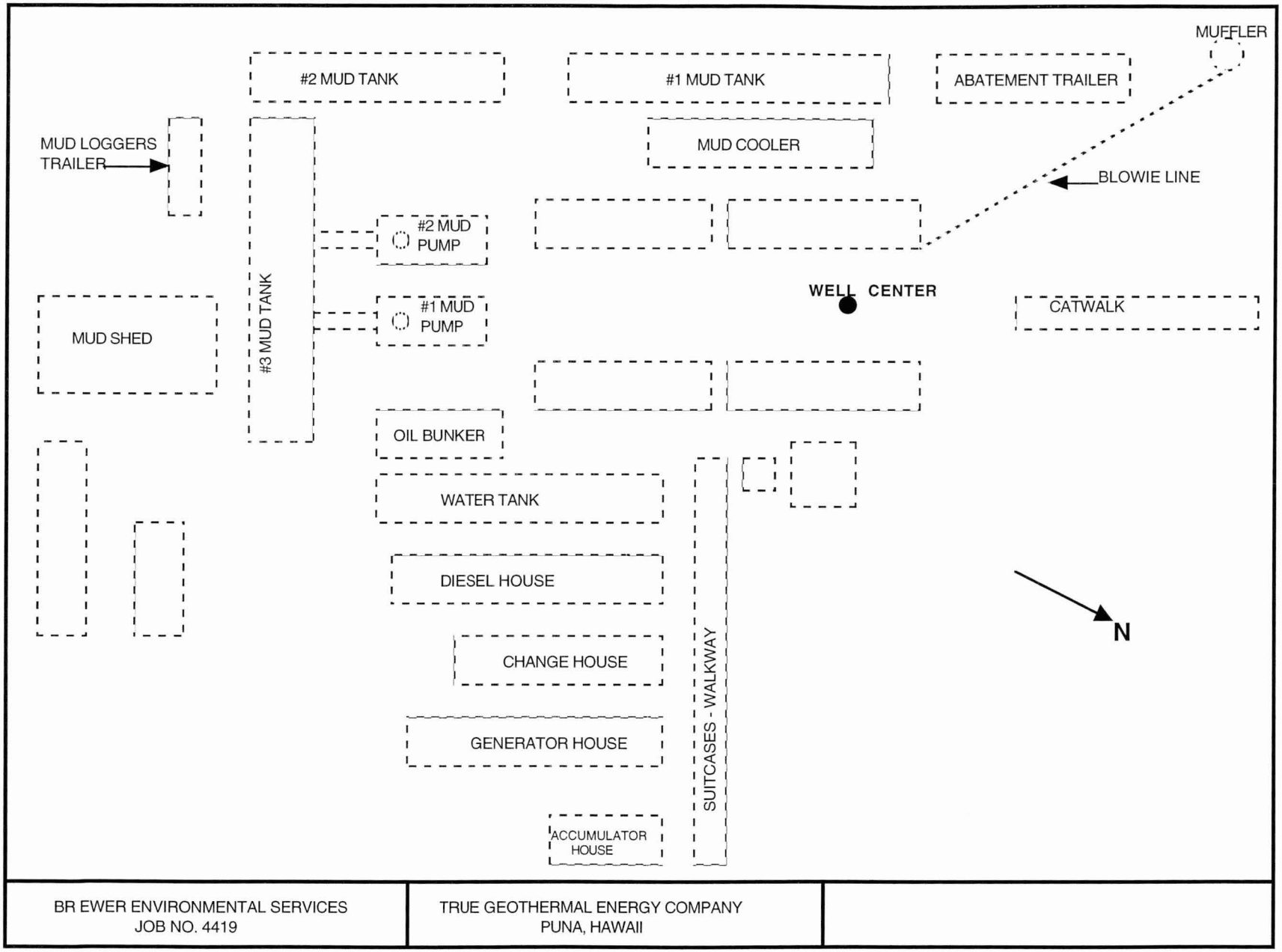


PREVIOUS LOCATIONS OF BUILDINGS
FIGURE



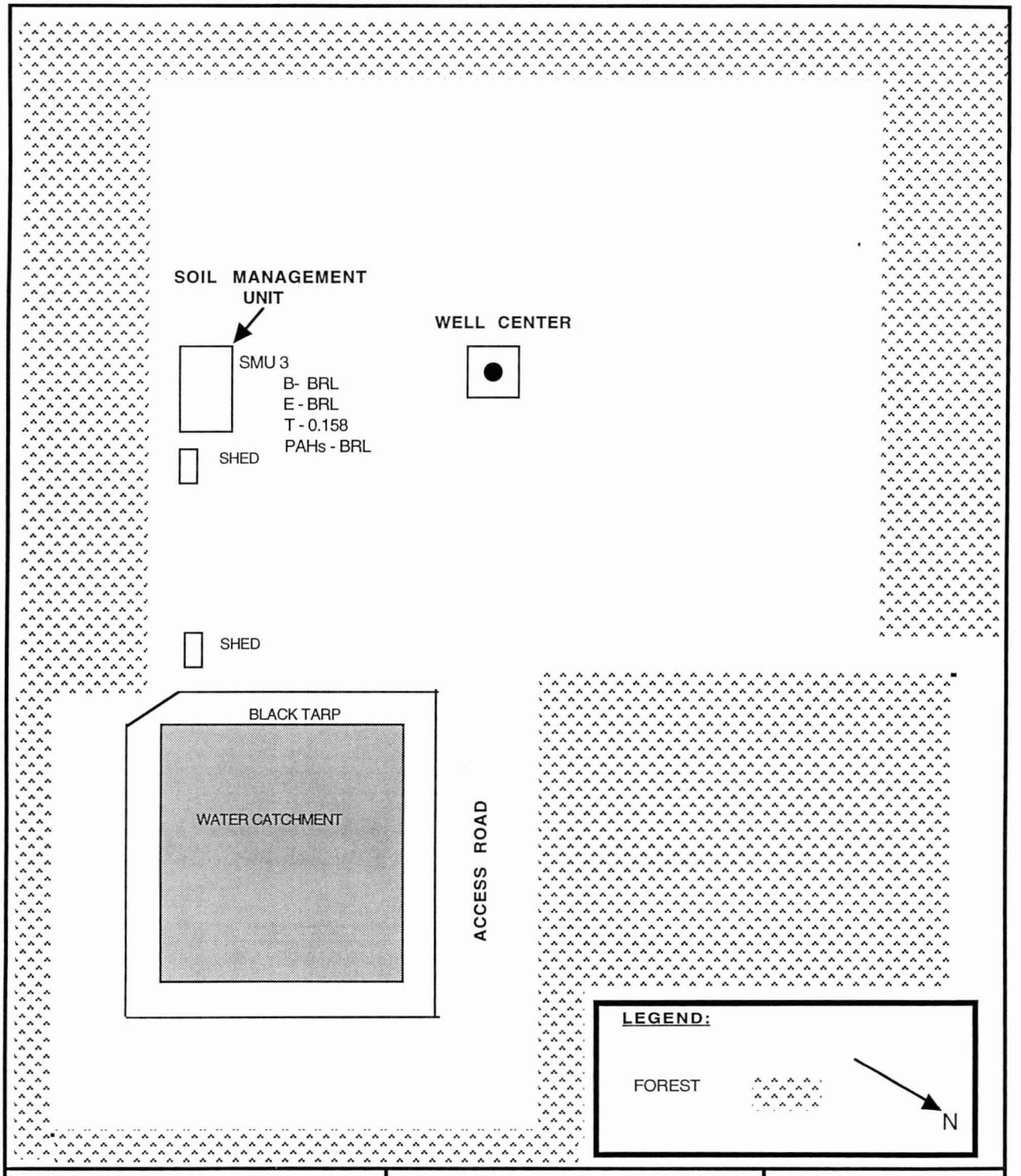
BR EWER ENVIRONMENTAL SERVICES JOB NO. 4419	TRUE GEOTHERMAL ENERGY COMPANY PUNA, HAWAII	

PREVIOUS LOCATIONS OF BUILDINGS
FIGURE



BR EWER ENVIRONMENTAL SERVICES JOB NO. 4419	TRUE GEOTHERMAL ENERGY COMPANY PUNA, HAWAII	

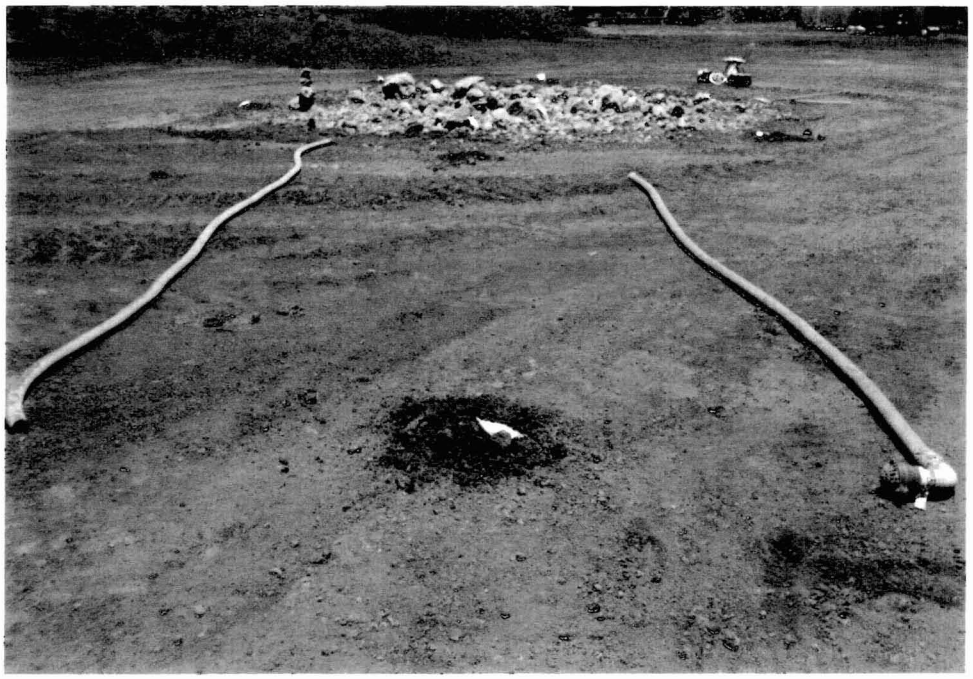
PREVIOUS LOCATIONS OF BUILDINGS
FIGURE



BREWER ENVIRONMENTAL SERVICES	TRUE GEOTHERMAL ENERGY COMPANY PUNA, HAWAII	SITE MAP NOT TO SCALE FIGURE 2
JOB NO. 4419		

APPENDIX B
PHOTOGRAPHS

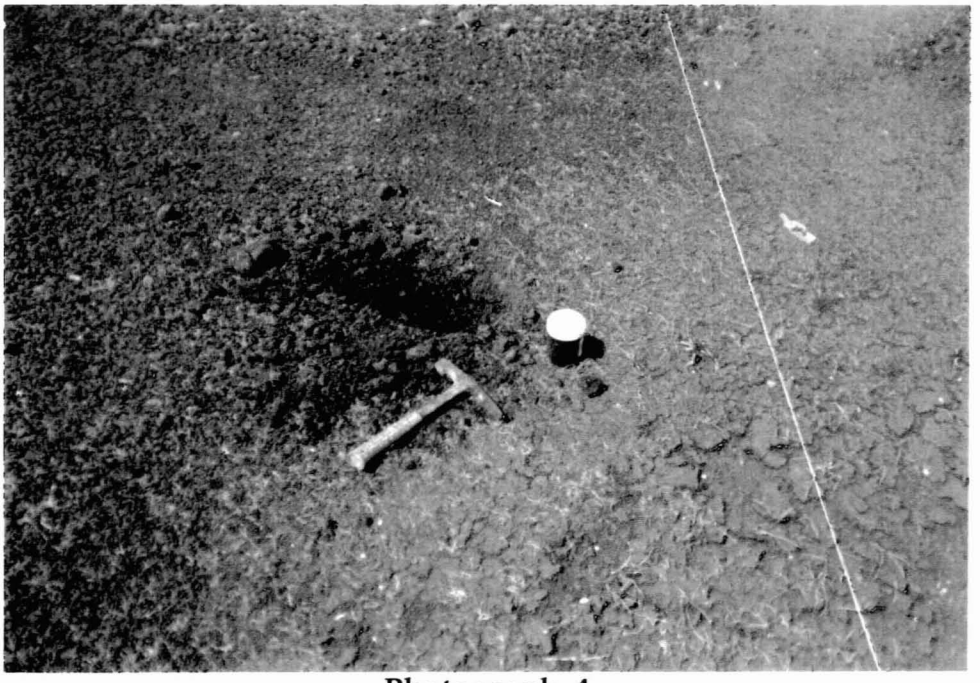
Photograph 1
Northwest to Southeast View of the Overexcavation
and Sample Headspace Locations Near 13,000 gallon AST



Photograph 2
Southeast to Northwest View of Overexcavation
and Sample Headspace Locations

Photograph 3

View of Sample TS-3, Former Location of 500-Gallon Diesel AST



Photograph 4

View of Sample TS1-6, Former location of 13,000-Gallon Diesel AST

APPENDIX C
BES HEADSPACE STANDARD OPERATING PROCEDURE

HEADSPACE ANALYSIS PROCEDURE

Presented below is the basic methodology for field screening of soil sample vapor. The screening is performed using an HNU Model DL 101 and/or Photo-Vac Model IS-3000 microtip portable photoionization Detector (PID) or Foxboro OVA Flame Ionization Detector (FID). These detectors are non-discriminatory and measure the total concentration of airborne ionizable gases and vapors. They are used for relative quantification of organic compound presence. With this capability, the detectors serve as useful tools in the screening of soil samples in the field. The basic method for field screening of a soil sample with the detector is as follows:

1) The soil sample is removed from the ground, or sample tube, or tip of the sampler and approximately one cubic inch is placed in a sealable polyethylene bag with a capacity of approximately 500 milliliters.

2) The sample is crushed through the walls of the bag to provide greater surface area for vapor offgassing.

3) Offgassing of the sample is allowed for approximately five minutes at ambient air temperature.

4) The bag is then pierced with the probe of the analyzer and the vapors are drawn out of the bag using the analyzer pump.

5) Readings are noted from the initial insertion to when the bag is collapsed. The sustained value for the reading is recorded unless there is moisture interference. In this case, the initial high reading is recorded before moisture interferences causes the reading to diminish.

6) If soil or excessive moisture is drawn into the instrument, the sample probe is thoroughly cleaned and air is passed through the system until the zero or background level is attained.

7) Readings are tabulated with the sample number and depth of the sample noted on the field log which is maintained by the on-site geologist.

APPENDIX D
LABORATORY REPORTS

BREWER
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a C BREWER company

LABORATORY ANALYSIS REPORT

Environmental Laboratories Division

CLIENT: BREWER ENVIRONMENTAL SERVICES
401 WAIAKAMILO RD. SUITE 101
HONOLULU, HI 96817

ATTN: DAVIS YOGI

JOB NUMBER: E5070307

DATE: JULY 19, 1995

PROJECT NAME: TRUE GEOTHERMAL
JOB# 4419

Matrix: SOIL

Date/Time Sampled: 06/29/95 @ 14:00
Date/Time Received: 07/03/95 @ 14:40

Client ID#: 4419.1
Lab Sample ID#: S1

ANALYSIS	RESULT	REPORTING LIMIT	UNIT	ANALYSIS DATE	METHOD NUMBER
BENZENE	BRL	0.002	mg/Kg	07/10/95	8020
ETHYLBENZENE	BRL	0.002	mg/Kg	07/10/95	8020
TOLUENE	BRL	0.002	mg/Kg	07/10/95	8020
XYLENES(TOTAL	BRL	0.002	mg/Kg	07/10/95	8020
PAHs					
ACENAPHTHENE	BRL	0.50	mg/Kg	07/14/95	8270
ACENAPHTHYLENE	BRL	0.50	mg/Kg	07/14/95	8270
ANTHRACENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(a)ANTHRACENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(a)PYRENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(b)FLUORANTHENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(ghi)PERYLENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(k)FLUORANTHENE	BRL	0.50	mg/Kg	07/14/95	8270
CHRYSENE	BRL	0.50	mg/Kg	07/14/95	8270
DIBENZO(a,h)ANTHRACENE	BRL	0.50	mg/Kg	07/14/95	8270
FLUORANTHENE	BRL	0.50	mg/Kg	07/14/95	8270
FLUORENE	BRL	0.50	mg/Kg	07/14/95	8270
INDENO(1,2,3-cd)PYRENE	BRL	0.50	mg/Kg	07/14/95	8270
NAPHTHALENE	BRL	0.50	mg/Kg	07/14/95	8270
PHENANTHRENE	BRL	0.50	mg/Kg	07/14/95	8270
PYRENE	BRL	0.50	mg/Kg	07/14/95	8270

BRL= Below Reporting Limit

Analyses performed at a BEL affiliate facility.

BREWER ENVIRONMENTAL LABORATORIES
311 PACIFIC STREET
HONOLULU, HI 96817
PHONE (808) 532-7497
FAX (808) 532-7498

Approved by: Vicki Hegger

BREWER
ENVIRONMENTAL
INDUSTRIES, INC.
a C. BREWER company

LABORATORY ANALYSIS REPORT

Environmental Laboratories Division

CLIENT: BREWER ENVIRONMENTAL SERVICES
401 WAIAKAMILO RD. SUITE 101
HONOLULU, HI 96817

ATTN: DAVIS YOGI

JOB NUMBER: E5070307

DATE: JULY 19, 1995

PROJECT NAME: TRUE GEOTHERMAL
JOB# 4419

Matrix: SOIL

Date/Time Sampled: 06/29/95 @ 14:15
Date/Time Received: 07/03/95 @ 14:40

Client ID#: 4419.2
Lab Sample ID#: S2

ANALYSIS	RESULT	REPORTING LIMIT	UNIT	ANALYSIS DATE	METHOD NUMBER
BENZENE	0.006	0.002	mg/Kg	07/10/95	8020
ETHYLBENZENE	BRL	0.002	mg/Kg	07/10/95	8020
TOLUENE	0.010	0.002	mg/Kg	07/10/95	8020
XYLENES(TOTAL	0.012	0.002	mg/Kg	07/10/95	8020
PAHs					
ACENAPHTHENE	BRL	0.50	mg/Kg	07/14/95	8270
ACENAPHTHYLENE	BRL	0.50	mg/Kg	07/14/95	8270
ANTHRACENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(a)ANTHRACENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(a)PYRENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(b)FLUORANTHENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(ghi)PERYLENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(k)FLUORANTHENE	BRL	0.50	mg/Kg	07/14/95	8270
CHRYSENE	BRL	0.50	mg/Kg	07/14/95	8270
DIBENZO(a,h)ANTHRACENE	BRL	0.50	mg/Kg	07/14/95	8270
FLUORANTHENE	BRL	0.50	mg/Kg	07/14/95	8270
FLUORENE	BRL	0.50	mg/Kg	07/14/95	8270
INDENO(1,2,3-cd)PYRENE	BRL	0.50	mg/Kg	07/14/95	8270
NAPHTHALENE	BRL	0.50	mg/Kg	07/14/95	8270
PHENANTHRENE	BRL	0.50	mg/Kg	07/14/95	8270
PYRENE	BRL	0.50	mg/Kg	07/14/95	8270

BRL= Below Reporting Limit

Analyses performed at a BEL affiliate facility.

BREWER ENVIRONMENTAL LABORATORIES
311 PACIFIC STREET
HONOLULU, HI 96817
PHONE (808) 532-7497
FAX (808) 532-7498

Approved by: Vicki Weiger

BREWER
ENVIRONMENTAL
INDUSTRIES, INC.
a C. BREWER company

LABORATORY ANALYSIS REPORT

Environmental Laboratories Division

CLIENT: BREWER ENVIRONMENTAL SERVICES
401 WAIAKAMILO RD. SUITE 101
HONOLULU, HI 96817

ATTN: DAVIS YOGI

JOB NUMBER: E5070307

DATE: JULY 19, 1995

PROJECT NAME: TRUE GEOTHERMAL
JOB# 4419

Matrix: SOIL

Date/Time Sampled: 06/29/95 @ 14:05
Date/Time Received: 07/03/95 @ 14:40

Client ID#: 4419.3
Lab Sample ID#: S3

ANALYSIS	RESULT	REPORTING LIMIT	UNIT	ANALYSIS DATE	METHOD NUMBER
BENZENE	BRL	0.002	mg/Kg	07/10/95	8020
ETHYLBENZENE	BRL	0.002	mg/Kg	07/10/95	8020
TOLUENE	0.002	0.002	mg/Kg	07/10/95	8020
XYLENES(TOTAL	0.003	0.002	mg/Kg	07/10/95	8020
PAHs					
ACENAPHTHENE	BRL	0.50	mg/Kg	07/14/95	8270
ACENAPHTHYLENE	BRL	0.50	mg/Kg	07/14/95	8270
ANTHRACENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(a)ANTHRACENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(a)PYRENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(b)FLUORANTHENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(ghi)PERYLENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(k)FLUORANTHENE	BRL	0.50	mg/Kg	07/14/95	8270
CHRYSENE	BRL	0.50	mg/Kg	07/14/95	8270
DIBENZO(a,h)ANTHRACENE	BRL	0.50	mg/Kg	07/14/95	8270
FLUORANTHENE	BRL	0.50	mg/Kg	07/14/95	8270
FLUORENE	BRL	0.50	mg/Kg	07/14/95	8270
INDENO(1,2,3-cd)PYRENE	BRL	0.50	mg/Kg	07/14/95	8270
NAPHTHALENE	BRL	0.50	mg/Kg	07/14/95	8270
PHENANTHRENE	BRL	0.50	mg/Kg	07/14/95	8270
PYRENE	BRL	0.50	mg/Kg	07/14/95	8270

BRL= Below Reporting Limit

Analyses performed at a BEL affiliate facility.

BREWER ENVIRONMENTAL LABORATORIES
311 PACIFIC STREET
HONOLULU, HI 96817
PHONE (808) 532-7497
FAX (808) 532-7498

Approved by: Verle Weyer

BREWER ENVIRONMENTAL INDUSTRIES, INC.
a C BREWER company

LABORATORY ANALYSIS REPORT
Environmental Laboratories Division

CLIENT: BREWER ENVIRONMENTAL SERVICES
401 WAIAKAMILO RD. SUITE 101
HONOLULU, HI 96817

ATTN: DAVIS YOGI

JOB NUMBER: E5070307

DATE: JULY 19, 1995

PROJECT NAME: TRUE GEOTHERMAL
JOB# 4419

Matrix: SOIL

Date/Time Sampled: 06/29/95 @ 14:10
Date/Time Received: 07/03/95 @ 14:40

Client ID#: 4419.4
Lab Sample ID#: S4

ANALYSIS	RESULT	REPORTING LIMIT	UNIT	ANALYSIS DATE	METHOD NUMBER
BENZENE	BRL	0.002	mg/Kg	07/10/95	8020
ETHYLBENZENE	BRL	0.002	mg/Kg	07/10/95	8020
TOLUENE	0.003	0.002	mg/Kg	07/10/95	8020
XYLENES(TOTAL	BRL	0.002	mg/Kg	07/10/95	8020
PAHs					
ACENAPHTHENE	BRL	0.50	mg/Kg	07/14/95	8270
ACENAPHTHYLENE	BRL	0.50	mg/Kg	07/14/95	8270
ANTHRACENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(a)ANTHRACENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(a)PYRENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(b)FLUORANTHENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(ghi)PERYLENE	BRL	0.50	mg/Kg	07/14/95	8270
BENZO(k)FLUORANTHENE	BRL	0.50	mg/Kg	07/14/95	8270
CHRYSENE	BRL	0.50	mg/Kg	07/14/95	8270
DIBENZO(a,h)ANTHRACENE	BRL	0.50	mg/Kg	07/14/95	8270
FLUORANTHENE	BRL	0.50	mg/Kg	07/14/95	8270
FLUORENE	BRL	0.50	mg/Kg	07/14/95	8270
INDENO(1,2,3-cd)PYRENE	BRL	0.50	mg/Kg	07/14/95	8270
NAPHTHALENE	BRL	0.50	mg/Kg	07/14/95	8270
PHENANTHRENE	BRL	0.50	mg/Kg	07/14/95	8270
PYRENE	BRL	0.50	mg/Kg	07/14/95	8270

BRL= Below Reporting Limit

Analyses performed at a BEL affiliate facility.

BREWER ENVIRONMENTAL LABORATORIES
311 PACIFIC STREET
HONOLULU, HI 96817
PHONE (808) 532-7497
FAX (808) 532-7498

Approved by: Verla Weyer

BREWER
ENVIRONMENTAL
INDUSTRIES, INC.
a C BREWER company

LABORATORY ANALYSIS REPORT

Environmental Laboratories Division

CLIENT: BREWER ENVIRONMENTAL SERVICES
401 WAIAKAMILO RD. SUITE 101
HONOLULU, HI 96817

ATTN: DAVIS YOGI

JOB NUMBER: E5070307

PROJECT NAME: TRUE GEOTHERMAL
JOB# 4419

DATE: JULY 19, 1995
Additional Results
Report Date: 07/27/95
Matrix: SOIL

Date/Time Sampled: 06/29/95 @ 14:47
Date/Time Received: 07/03/95 @ 14:40

Client ID#: 4419.smu3
Lab Sample ID#: S5

ANALYSIS	RESULT	REPORTING LIMIT	UNIT	ANALYSIS DATE	METHOD NUMBER
BENZENE	BRL	0.002	mg/Kg	07/10/95	8020
ETHYLBENZENE	BRL	0.002	mg/Kg	07/10/95	8020
TOLUENE	0.158	0.002	mg/Kg	07/10/95	8020
XYLENES(TOTAL	0.108	0.002	mg/Kg	07/10/95	8020
PAHs **					
ACENAPHTHENE	BRL	0.50	mg/Kg	07/24/95	8270
ACENAPHTHYLENE	BRL	0.50	mg/Kg	07/24/95	8270
ANTHRACENE	BRL	0.50	mg/Kg	07/24/95	8270
BENZO(a)ANTHRACENE	BRL	0.50	mg/Kg	07/24/95	8270
BENZO(a)PYRENE	BRL	0.50	mg/Kg	07/24/95	8270
BENZO(b)FLUORANTHENE	BRL	0.50	mg/Kg	07/24/95	8270
BENZO(ghi)PERYLENE	BRL	0.50	mg/Kg	07/24/95	8270
BENZO(k)FLUORANTHENE	BRL	0.50	mg/Kg	07/24/95	8270
CHRYSENE	BRL	0.50	mg/Kg	07/24/95	8270
DIBENZO(a,h)ANTHRACENE	BRL	0.50	mg/Kg	07/24/95	8270
FLUORANTHENE	BRL	0.50	mg/Kg	07/24/95	8270
FLUORENE	BRL	0.50	mg/Kg	07/24/95	8270
INDENO(1,2,3-cd)PYRENE	BRL	0.50	mg/Kg	07/24/95	8270
NAPHTHALENE	BRL	0.50	mg/Kg	07/24/95	8270
PHENANTHRENE	BRL	0.50	mg/Kg	07/24/95	8270
PYRENE	BRL	0.50	mg/Kg	07/24/95	8270

** Original extract was accidently disposed of. The results are from a secondary extract obtained after the expiration of the recommended holding time for extraction of the sample.
BRL= Below Reporting Limit
Analyses performed at a BEL affiliate facility.

BREWER ENVIRONMENTAL LABORATORIES
311 PACIFIC STREET
HONOLULU, HI 96817
PHONE (808) 532-7497
FAX (808) 532-7498

Approved by: Vicki Weyer

Brewer Environmental Laboratories
P.O. Box 552
Papaikou, HI, 96781
(808)964-5522 FAX:(808)964-5309
Toll Free from Oahu: 528-4247

CHAIN OF CUSTODY & ANALYSIS REQUEST

Project Name: True Geothermal
Job#: 4419
Lab Job#:

Page_____of_____

Name and address where results and invoice are to be sent:
Firm: Brewer Environmental Service
Address: 401 Waiakamilo Rd, Ste 101
City: Honolulu State: HI Zip: 96817
Phone#: (808) 8327900 FAX#: 832 7901
Contact Person: Davis Yogi

Name and address for additional results if other than first:
Firm:
Address:
City: State: Zip:
Phone#: FAX#:
Contact Person:

Comments:
Special Instructions: 4419.smu3. Extract for PAH to preserve hold time. See below for run instructions.
Special Instructions: 4419.smu3 - Please perform BTEX. If BTEX is below .05 ppm, then analyze sample for PAH.

*Matrix
S=Soil
W=Water
O=Oil
SLD=Sludge

Sampled By: DKY

Witnessed By: GD

Samples received chilled? Yes No

Samples in good condition? Yes No

Total # of Containers:

Samples received at lab with custody seals intact? Yes No

LAB ONLY	Sample Location ID	Sample Date	Sample Time	Matrix *	#of Cont.	Size	UST Pkg.	TRPH 418.1	Heavy Metals Pkg.	Total Coliform MF or MPN	Used Oil Pkg.	RCRA	BTEX	PAH	RUSH	PRESERVED
	4419.1	6/29	2:00p	s	2								x	x		
	4419.2	6/29	2:15p	s	2								x	x		
	4419.3	6/29	2:05p	s	2								x	x		
	4419.4	6/29	2:10p	s	2								x	x		
	4419.smu3	6/29	2:47p	s	2								x	x- see comments		
	COC amendment per client instructions of July 6, 1995.															

Relinquished By:	Relinquished By:	Relinquished By:	
Signature: [signature] Date: 7/6/95	Signature: Date:	Signature: Date:	24 hr
Printed Name: Time:	Printed Name: Time:	Printed Name: Time:	48 hr
Received By:	Received By:	Received By:	
Signature: Date:	Signature: Date:	Signature: Date:	3-5d
Printed Name: Time:	Printed Name: Time:	Printed Name: Time:	

Brewer Environmental Laboratories
P.O. Box 552
Papaikou, HI, 96781
(808)964-5522 FAX:(808)964-5309
Toll Free from Oahu: 528-4247

CHAIN OF CUSTODY & ANALYSIS REQUEST

Project Name: TRUE GEOTHERMAL
Job#: 4119
Lab Job#:

Page 1 of 1

Name and address where results and invoice are to be sent:
Firm: BES
Address: 1001 KAMAKAU HILO RD #101
City: HONOLULU State: HI Zip: 96817
Phone#: 622-7766 FAX#: 622-7901
Contact Person: DAVID NOA

Name and address for additional results if other than first:
Firm:
Address:
City: State: Zip:
Phone#: FAX#:
Contact Person:

Comments:
P.O. # 057771

*Matrix
S=Soil
W=Water
O=Oil
SLD=Sludge

Sampled By: J. AKI

Witnessed By:

Samples received chilled? Yes No

Samples in good condition? Yes No

Total # of Containers: 1

Samples received at lab with custody seals intact? Yes No N/A

LAB ONLY	Sample Location ID	Sample Date	Sample Time	Matrix *	#of Cont.	Size	UST Pkg.	TRPH 418.1	Heavy Metals Pkg.	Total Coliform MF or MPN	Used Oil Pkg.	RCRA	FAH								RUSH
	4119.1	8/3/15	0730	S	1	4oz							X								

Analysis Requested

Relinquished By:
Signature: [signature] Date: 8/4/15
Printed Name: JEFF AKI Time: 0733
Received By:
Signature: [signature] Date: 8/4/15
Printed Name: [illegible] Time: 0933

Relinquished By:
Signature: Date:
Printed Name: Time:
Received By:
Signature: Date:
Printed Name: Time:

Relinquished By:
Signature: Date:
Printed Name: Time:
Received By:
Signature: Date:
Printed Name: Time:

24 hr
48 hr
3-5d